SUBJECT INDEX

absorption coefficient 212
acetone 192
acetonitrile 188, 194, 196, 209
active polymers
  block copolymers prepared from 74–84
  obtained from azoperoxy initiators 90–103
  obtained with polyazo initiators 84–90
active polymers with peroxy groups 63–6
adhesives 285–91
alkylazo derivatives 19–23
alkylcarbonyl azo derivatives 23–4
aromatic nucleophilic displacement reaction 111
  activation of 114–17
    by carbonyl group 114
    by other groups 116
  effect of reaction conditions 118–20
  mechanism of 112–13
  reactivity of nucleophile 117–18
aromatic polyethers, nucleophilic displacement polymerization 111–53
azo peresters 25–9
azo peroxides 24–5
azodiacyl peroxides 29–35
azodialkyl peroxides 35–6
azoperoxy initiators 90–103
  thermal and photochemical decomposition 53–61

batteries 208
benzonitrile (PhN) 188
biperoxides, thermolysis of 36–48
bipolarons 203–6, 208, 209
bis-(diacyl peroxides) 6–10
block copolymers
  general considerations 74–5
  heterogeneity of 79
  molecular weight distribution 79
  obtained from azoperoxy initiators 90–103
  obtained with polyazo initiators 84–90
  prepared from active polymers 74–84
  separation and yields obtained 77–9
  synthesis conditions and characteristics of 75–7
brine electrolysis 263–5

carbonyl group, displacement reaction activation 114–16
carboxylated perfluorovinyl ethers 234
charge-transfer processes 202
chloropentafluoropropylene oxide 233
chlorophyll 180
choromethyl styrene 207
conducting polymers 179–218
cyclic voltammetry (CV) 196

dichloromethane 192
differential scanning calorimetry (DSC) 285
dimethylsulfide (DMS) 278
dimethylsulfoxide (DMSO) 278
3,4-dimethylthiophene 213
diperoxides 17
diperoxy esters 3
2,2'-dithiophene 213
doping techniques 182–90
dynamic mechanical analysis (DMA) 285

electrical conductivity 192
electrochemical cells, electrochemical polymerization 182
electrochemical spectroscopy 196–8
electrochemical voltage spectroscopy (EVS) 196
electro-optic devices 211–13
electro-organic synthesis 267–8
ESR spectroscopy 200

ferrocyanide 213
Ficus elastica 176
Flemion membrane 234
fluorinated polymers, introduction of acid groups into 231–2
fluorocarbon acid polymers 229–70
  applications 260–9
  chemical structure 237
  conductivity 255–8
  crystallinity 242–5
  development 231–2
  diffusibility through membranes 258–60
  ion cluster morphology 249–52
  polymerization 237–42
  structure and characterization 242–60
  synthesis 232–42
  synthesis of acidic monomers 233–7
  viscoelastic behaviour 245–7
free-radical polymerization, with bi- and poly-functional initiators 61–103
fuel cells 261–2
  hydrogen–halogen regenerative 262
  hydrogen–oxygen 261

gel permeation chromatography (GPC) 192
glass-transition temperature 190
glutamate 213

HCHO 282
hevea rubber 156
  chlorinated 165
  comparison with other plant rubbers 159
hexamethylene diisocyanate (HDI) 290
HFPO 233–5, 267
HMTA 280, 282
hydroxypropyl–lignin (HPL) 284–5

indium–tin oxide (ITO) 182
infra-red studies on plant rubbers 156–66
ion exchange membrane, water electrolysis 266
ion selective electrodes 268

kraft black liquor (KL) 286, 291
kraft lignin formaldehyde (KLF) polymers 291
kraft lignin (KL) 288, 291, 293, 294

lignin
  alkaline 295
  as energy source 278
  as polymer base 277–96
  biosynthesis 274, 275
  carboxy-oxylation with propylene oxide 282, 283
  chemical products derivable from 278
  chemistry of formation 274
  coniferous 274
  content of North American woods 273
  content of plant materials 273
  current and suggested uses 277
  formation simulation model 276
  functions or purposes in plants 272
  kraft 288, 291, 293, 294
  microstructure 276
  precursors 275
  product applications 277
  properties of 276
  structural units 274
  technical 277
  utilization studies 271
  ways to modify 279
lignin–elastomer systems 291–6
lignin–graft copolymers 280
lignin–isocyanate adhesives 290–1
lignin–phenol formaldehyde adhesives 285, 286
lignin–polyisocyanate adhesives 285
lignin–polymer adhesive systems 285–91
lignin–polymer systems 271–99
lignin–thermosetting polymer systems 280
lignin–urea formaldehyde adhesives 285, 289

medicinal applications 213
methyl 3-methoxy-tetrafluoropropionate 235
N-methyl pyrrole 207
methylene polydiisocyanate (MDI) 290
3-methylthiophene 213
microcyanine 180
molecular weight, parameters influencing 73
molecular weight distribution (MWD) 73–4, 79

natural rubber 155
neoprene rubbers 294
neuroscience 213
nitrile rubbers 294
nuclear magnetic resonance
  ^{13}C NMR 174–5, 201–2
  ^{1}H NMR 166–74
  high-resolution 168–71
  plant rubbers 166–76
nucleophilic displacement polymerization
  aromatic polyethers 111–53
  polymer syntheses by 123
  synthesis of precursors for polyethers 120–3

oligoperoxy esters 3
optical absorption spectra 199
optical spectroscopy 198

perester–diacyl peroxides 10–12
perfluorinated acid polymers
  ion permselectivity 253–5
  membrane properties 253–60
perfluoroacrylic derivatives 231
perfluorocarboxylate polymers, general formulae 237
perfluorocarboxylic acid polymers
  conductivity 255–8
  dynamic mechanical spectra 246–8
  ion permselectivity 253–5
  ionic spacing and H_2O content 250
  membrane properties 253–60
  X-ray diffraction spectra 244
  X-ray scattering spectra 249

perfluorosulfonate polymers, general formulae 237
perfluorosulfonic acid polymers
conductivity 255–8
dynamic mechanical spectra 245
history 230
ionic spacing and H_2O content 250
transmission electron micrograph 252
X-ray diffraction spectra 244
X-ray scattering spectra 249
perfluorovinyl carboxylic acid 231
perfluorovinyl ethers 232, 233
permeation distillation 268
peroxy ester-dialkyl peroxides 12–14
peroxy groups, active polymers with 63–6
peroxy initiator behaviour in polymerization 63
photo-electrochemical cells 209–10
photoelectron spectroscopy 201–2
phthalocyanines 180
plant rubbers
cyclization/isomerization 163
effect of crystallinity 159–60
infra-red studies on 156–66
microstructure of 160
nuclear magnetic resonance 166–76
oxidation 164–5
spectral studies on 155–78
vulcanization 163
polarons 203, 204, 208, 209
poly(3-methylthiophene) 191, 196, 199
poly(3-methylthiophene) phosphorous hexafluorate 194
polyacetylene 180, 207, 210
trans-polyacetylene 180. 202, 204
polyacetylene–polyisoprene copolymers 192
polyacetylene–poly(*p*-phenylene) copolymers 192
polyaniline 181, 190
polyaromatics 179–218
application of 208–14
characteristics of 184
conducting 190–202
doping percentage 192–6
electrical conduction 202–6
mechanical properties 192–6
molecular weight 192–6
morphology 192–6
spectroscopy of 196–202
stability of 190–2
structures of 181
polyazo derivatives 18–19
polyazo initiators 84–90
thermolysis and photolysis behavior 48–53
polyazulene 181, 189–92, 198, 206
polyazulene perchlorate 199
polyazulene-ClO_4 200
polyazuline 196
polybutadiene glycol (PBDG) 285
polycarbazole 180, 181
polydimethylpyrrole 198, 203
β,β'-poly (dimethylpyrrole perchlorate) 192
poly (β,β'-dimethylpyrrole tetrafluoroborate) 192
polydimethylsiloxane–lignin polyblends 294–5
polydimethylthiophene 199
poly(2,3-dimethylthiophene) 209
polydithiophene 181
polyetherimides 134–8
polyetherketones 130
polyethers
phase-transfer catalysis 138–43
properties of 143–8
synthesis of precursors for 120–3
polyethersulfones 123–7
poly (ethylene glycol)s (PEG) 284–5
polyfuran 180, 181, 190, 206, 213
polyhalopyrroles 199
polyheterocyclics 179–218
application of 208–14
characteristics of 184
conducting 190–202
doping percentage 192–6
electrical conduction 202–6
mechanical properties 192–6
molecular weight 192–6
morphology 192–6
physical parameters 193
spectroscopy of 196–202
stability of 190–2
structures of 181
polyindole 180, 181, 196
polyisoprenes (PIP) 155
biosynthesis mechanism 176–7
infra-red studies 156–66
microstructure of 168
nuclear magnetic resonance 166–76
photo-oxidation of 161
photolysis of 161
UV irradiation 161
polyisoprenoid alcohols 176
polyisothianaphthalene 181
polymer catalysts 268
polymer precursors for displacement polymerization 120–3
polymer syntheses by nucleophilic displacement polymerization 123
polymerization
conducting 188
electrochemical 182, 188
polymerization initiators 1–109
biperoxide 3–18

decomposition kinetics 36–61
free-radical polymerization with bi- and poly-functional 61–103
general considerations 2
main types of 3–36
polyperoxidic 3–18
structure and syntheses 3–36
polymerization reaction, kinetic aspects of 66–72
polymerization techniques 182–90
poly (3-methoxythiophene) 213
poly (methylthiophene) 209
polyperoxides 17
thermolysis of 36–48
polyphenylene ethers 131–4
polyphenylene oxide–pyrrole 205, 207
poly(*p*-phenylene) (PPP) 182
poly(*p*-phenylene sulfide) (PPS) 182
polyphenylene sulphides 280
polypyrene 181, 206
polypyridazine 181
polypyrrole 180, 181, 189–91, 196, 198, 200, 203, 205–8, 210, 211, 213
polypyrrole perchlorate 190, 194, 196, 199, 201, 203
polypyrrole tetrafluoroborates 194
polypyrrole toluene sulfonates 194
polyselenophene 181, 205
polysulfones
degradation 219–24
stabilization 224–7
polytetrafluoroethylene (PTFE) 232
polythiophene 180, 181, 190, 191, 194, 196–9, 206–9, 211, 213
polythiophene perchlorate 190, 194
polythiophene tetrafluoroborate 194
polyurethane films, lignin-based 284
polyurethane foams 281
poly (*N*-vinyl carbazole) 214
poly (vinyl-chloride) 207
pyrroles, *N*-substituted 207

restricted Hartree-Fock (RHF) techniques 180, 204

Schottky barriers 207, 210–11
Schottky junctions 180
semiconductors 180, 196
sensors 213
silicone rubber 291
silver perchlorate 196
small angle X-ray scattering 249–52, 285
$(SN)_x$ 180
solar cells 180, 210–11
solid polymer electrolyte (SPE) cells 260
solid-state devices 210–11
solitonic defects 202
spectral studies on plant rubbers 155–78
spent sulphite liquor (SSL) 286, 289, 291
squarylium 180
standard calomel electrode (SCE) 183
steam explosion lignin (SEL) 288
styrene 207
styrene–butadiene rubber (SBR) 292

tetrabutyl ammonium fluoroborate 194
tetrahydrofuran (THF) 188, 192
thermal analysis 190
toluene diisocyanate (TDI) 290

urethane foams 282
UV irradiation
effect on microstructure of 1,4-PIP 171–4
polyisoprenes (PIP) 161

—

valence effective Hamiltonian (VEH) 180, 204
vanillin 278
variable-range-hopping mechanism 206

water electrolysis 265
alkaline type ion-exchange membrane 266
SPE type 265–6
wide angle X-ray diffraction spectra 243, 244